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Peer-to-peer electricity

Flexibility in a period of disruptive change

Energy wellbeing and climate justice

# Community Energy in Aotearoa

# Outline

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- Blueskin case study
- Community Energy: actors and value(s)
- Iwi Energy
- International Inspiration
- Observations

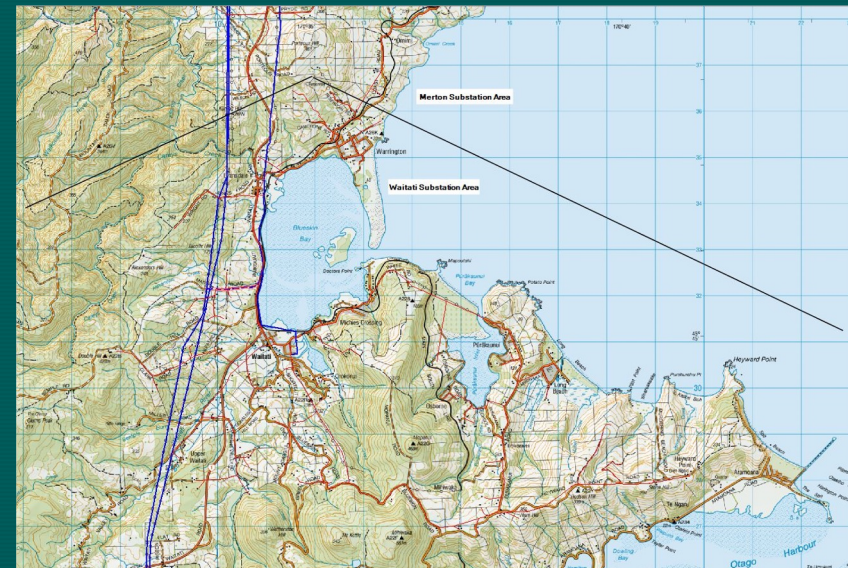
# 'Rise of the Prosumer' – the Blueskin story

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- Beginnings / motivation / values
- 'Glide Path' to 'Enduring Grid'
- MOU and initiatives
- Solar project (& EVs)
- Wind farm and BEN ambition



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## Vision


Blueskin Energy Network as the enabler of a prosumer model, working with the EDB.

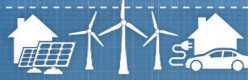
## BLUESKIN ENERGY PROJECT


- 1 The internet of things using smart algorithms and clever inverters allows a community to generate and retrieve power without disturbing the grid's delicate voltage balance. This is called a smart grid, like the BEN model in Blueskin Bay.



- 2 Community scale renewable electricity generation embedded in a local network can substantially power a smart grid, and contribute to the goal of 100% renewable electricity.

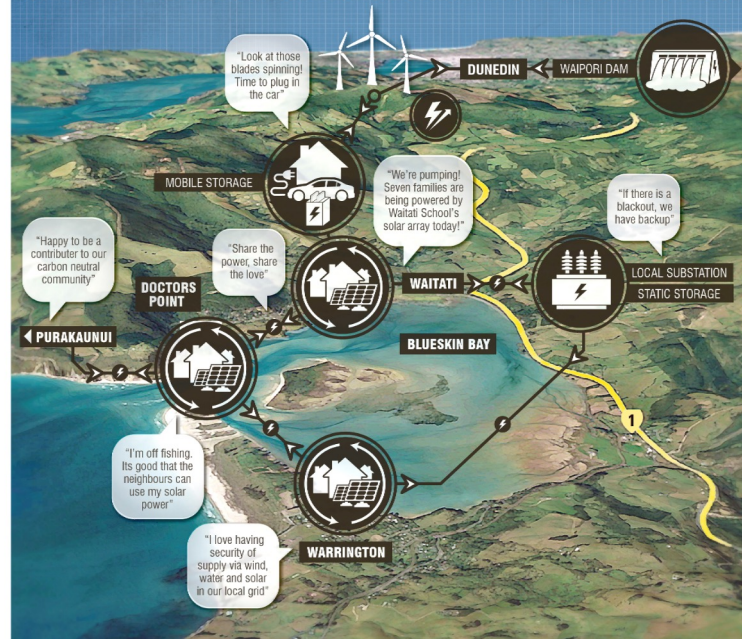

- 3 The consumer-centric model of electricity transactions where customers consume, trade, generate and store electricity using digital tools constitutes the motor of smart grid and function.


- 4 If a black-out occurs in the main grid, the smart grid can work in isolation through a combination of community scale (i.e. wind power) and micro generation (i.e. household solar) and static and mobile storage (i.e. substation batteries and electric car batteries) all managed at the level of the local substation.


- 5 A smart grid using renewables and storage can be 100% renewable and reliable by balancing generation and demand. It makes the power system more efficient by eliminating the 15% loss of electricity from long distance transmission and eliminating power generated at coal and gas-fired power plants.


- 6 The smart grid can be paired with other local networks to provide a giant, interconnected, resilient system linked through the national grid with each local area able to function independently in times of crisis, power can also be directed to the most critical needs, i.e. a hospital or police station.





# A collaboration to trial peer-to-peer and develop Type 2 retail

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Earn rewards for off-peak power use.

Enjoy price consistency with an opportunity to save.



**BLUESKIN ENERGY NETWORK**

**DEMOCRATISING ELECTRICITY**  
ben.p2power.co.nz

Email: info@p2power.co.nz  
Freecall: 0800 364 872

<b>CLEANER</b> BEN helps locals use renewable electricity through an interactive local grid.	<b>CHEAPER</b> BEN keeps prices low and stable and looks for ways to reduce costs further.	<b>SMARTER</b> BEN lets us share power, peer to peer so you don't need to own solar to use it.	<b>LOCAL</b> BEN serves locals from Owaka in the south to Shag Point in the north, and inland to Omakau. Contact us!
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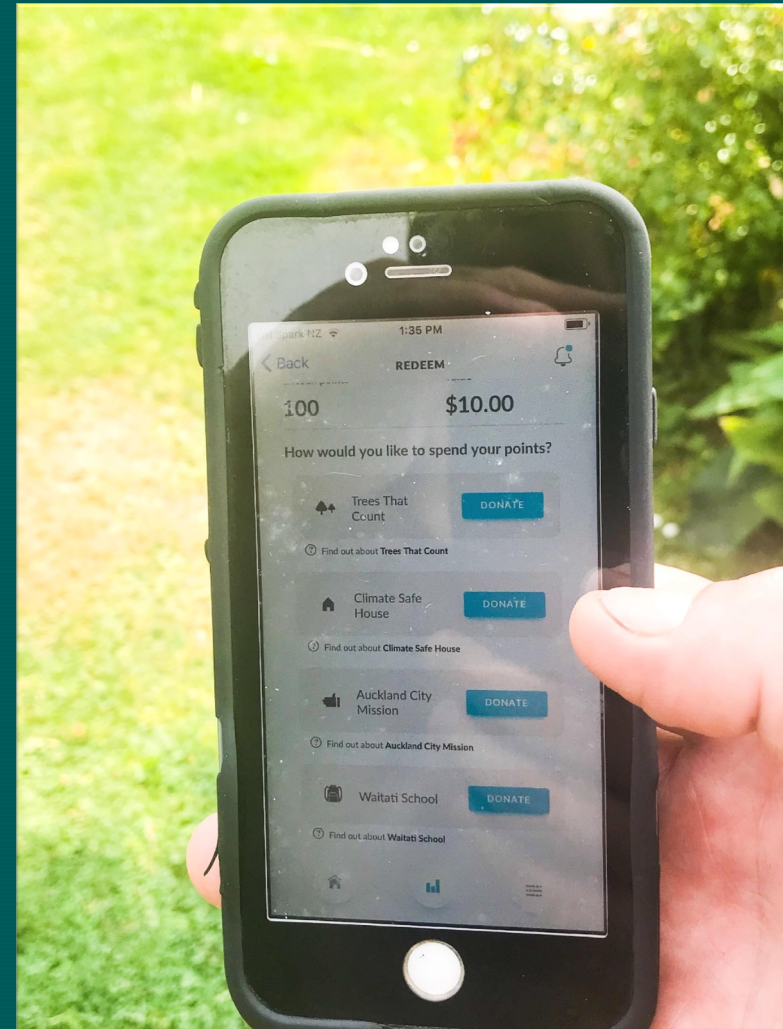
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## Community Prosumers

- Active consumers & advocates
- Consumer feedback (TOU?)
- Rich & reliable metrics, systems feed
- Automated analytics with optimization
- “New” technologies, ongoing innovation



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## BEN development pathway

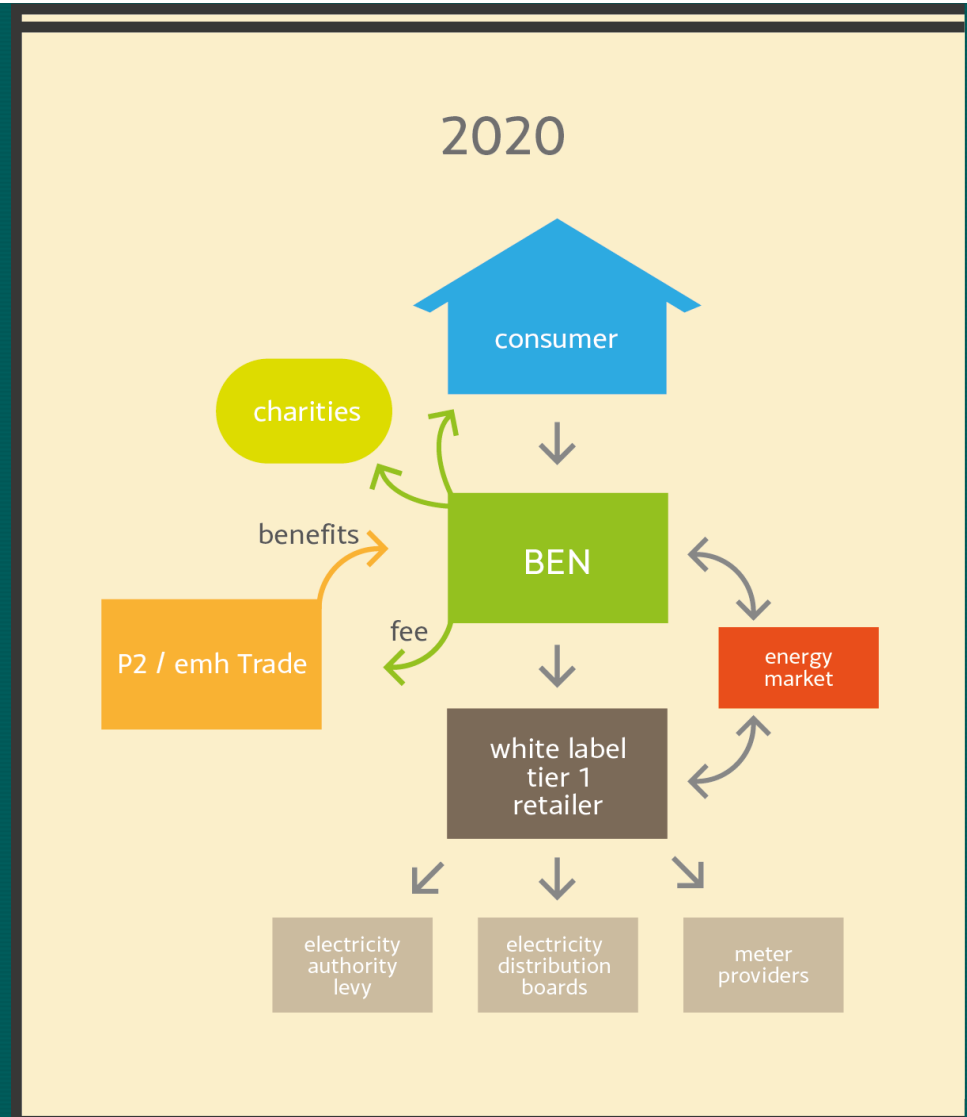
Outsource expertise and capability to reduce initial costs and risk

Rapid prototyping of future changes

A high level of responsiveness to emerging customer needs

Close monitoring of results

Learning through doing



# Community Energy: Actors and Value(s)

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## Lodestone Two

Lodestone Two is our northern most farm, located near Kaitaia. A 62 GWh solar plant, Lodestone Two will have up to 80,000 solar panels and will supply electricity directly to a Top Energy substation, where it will help power the local mill. The project will also incorporate native replanting with just over 7 hectares of the property to be revegetated.





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## Community Energy Network

17 full member orgs

18, 000 home assessments completed p/a.

\$10M spend on retrofit (material and staff) for \$45M value to community.

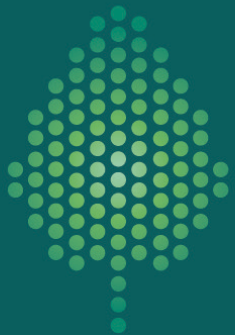
135, 000 households insulated, over 250,000 assessed over the last 20 years and in the system.

Community support retail and community renewables



# Cheaper, cleaner, smarter A flexible, resilient, participatory energy system

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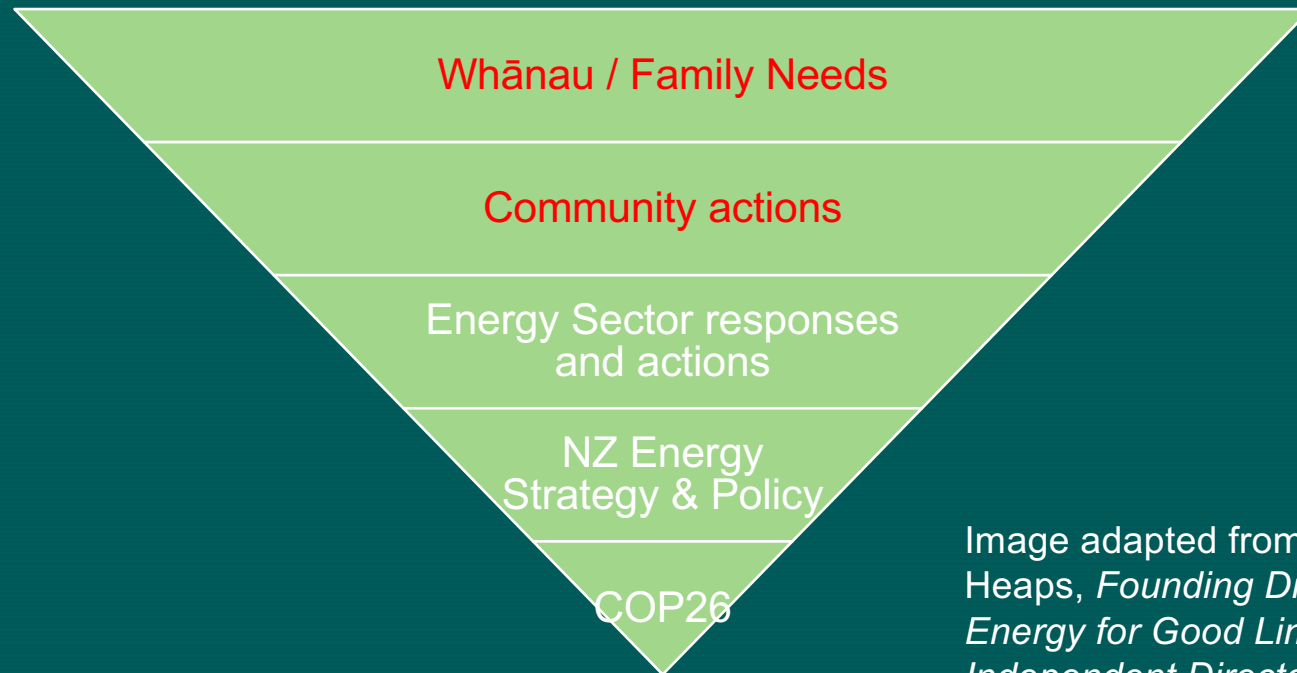
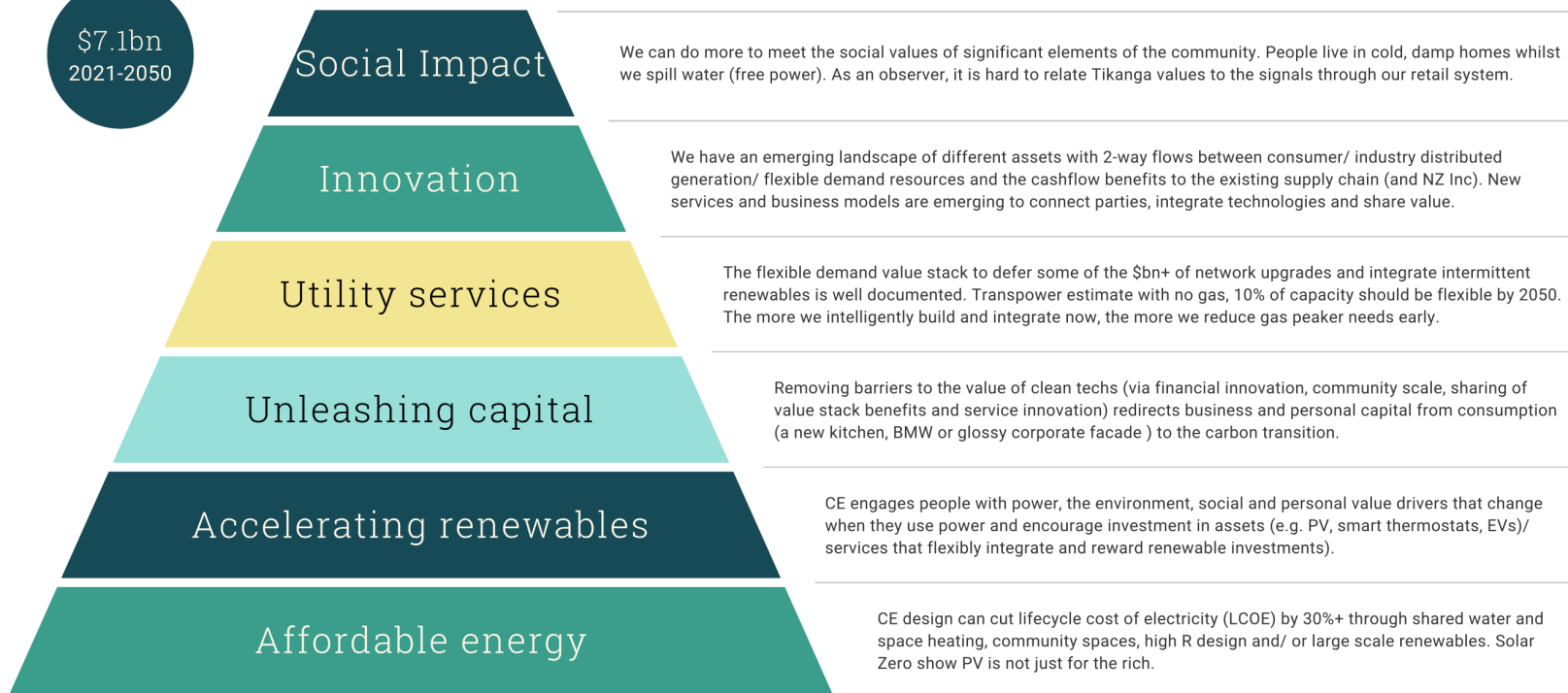


Image adapted from Bill Heaps, *Founding Director of Energy for Good Limited and Independent Director of the Community Energy Network (CEN)*.

Community energy engages personal and business capital, assets and behaviours (DERs) in a flexible system

# CE taps in to value that accelerates decarbonisation

\$7.1bn  
2021-2050



Slide courtesy of Jamie Silk /SAIL

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Community  
Engaged in  
Energy  
Transitions

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# Energy Democracy

## Participation

- Planning and decision making, through citizens fora, policy co-design initiatives and public consultation on new energy strategies and initiatives (Burke and Stephens 2017)

## Control

- Local and community energy ownership, remunicipalization of utilities

## 3Rs

- **Resisting** fossil fuel industry expansion;
- **Reclaiming** public ownership of energy assets and planning, and;
- **Restructuring** energy systems to increase renewables, conservation and the development of low-carbon employment options (Sweeny 2013)

# Community projects (generation and / or retail)

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## Blueskin

- 3MW wind farm – failed consent 2017
- Blueskin Energy Network P2P retail partnership – closed 2020

## Sustainability Trust

- Poneke Power – Community Support Retailer (Energy Wellbeing)

## Xtreme Zero Waste Trust

- Raglan Community Energy retail & generation partnership



# Why Community Energy?

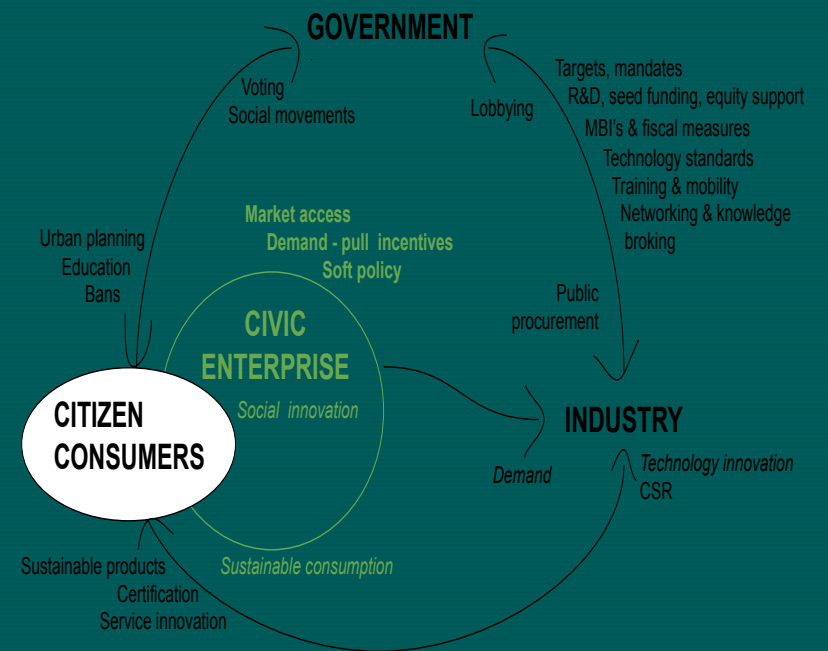
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- Civic enterprise has been a key component of successful low carbon innovation to date
- Matches community demand to participate and be involved/invest in the energy sector
- Widens distribution of benefits = public buy-in = conducive legislative reforms = policy stability = more rapid energy transitions.

Credit to Anna Berka for this slide



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## Iwi Energy

“Our whānau use solar panels on our homes and marae to generate and share our own electricity

Our iwi uses the wind, water and sun on our lands to generate and share our own electricity across our whānau, hapū and marae”

**TE ARA KI KŌPŪ | TE  
ARAWA CLIMATE  
CHANGE STRATEGY**





# Iwi projects

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- Lodestone 2, in collaboration with Ngai Takoto and Te Rarawa
- Nau Mai Rā - NZ's first Māori power company
- Manaaki Energy Ltd
- Ngāi Tūhoe - feasibility MBIE
- Te Arawa - Ohinemutu/Rotokawa Geothermal Resource ++
- Parihaka - over a decade of studies, community engagement, 30 year roadmap and now PV/ ESS funding from the MBIE fund

*"This vehicle has wheels and it will keep rolling!"* Paul Hanson, Te Rarawa

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## International Inspiration

### A. Hepburn Wind

- Two 2MW turbines
- 'Embark' established
- Retail coop, solar, energy efficiency...



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## B. Windcentrale, Netherlands - 2010

### Consumer co-operative

-Dutch citizens can buy equity shares for 250-300EUR

-10 turbines, 850-2300kW, 15.000 investors, 15m EUR invested

-Members receive dividend in form of electricity based on actual power production

-Windcentrale does not own equity; manages the project only, takes fixed fee per share (10%).

-Seed financed by two founders + NGO + bank grant

-Motivation: energy savings, political mobilisation, increased environmental values/behaviour



Thanks to Anna Berka

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## C. Mittelgrunden Vindmøllelaug, Denmark - 1996

### Shared ownership with producer co-operative

- 20\*2MW Siemens Windpower
- 3.5km East of Copenhagen harbour
- Site identified by Danish Action Plan for Offshore wind
- Initiative led by Copenhagen Environment and Energy Office
- 50% Municipal utility (Copenhagen Energy) > sold to Energi E2
- 50% Mittelgrunden wind turbine co-operative - 8.553 members, 48.5m EUR total investment
  - Each share = 1000kWh/y, sold for 567 Euro.



Thanks to Anna Berka

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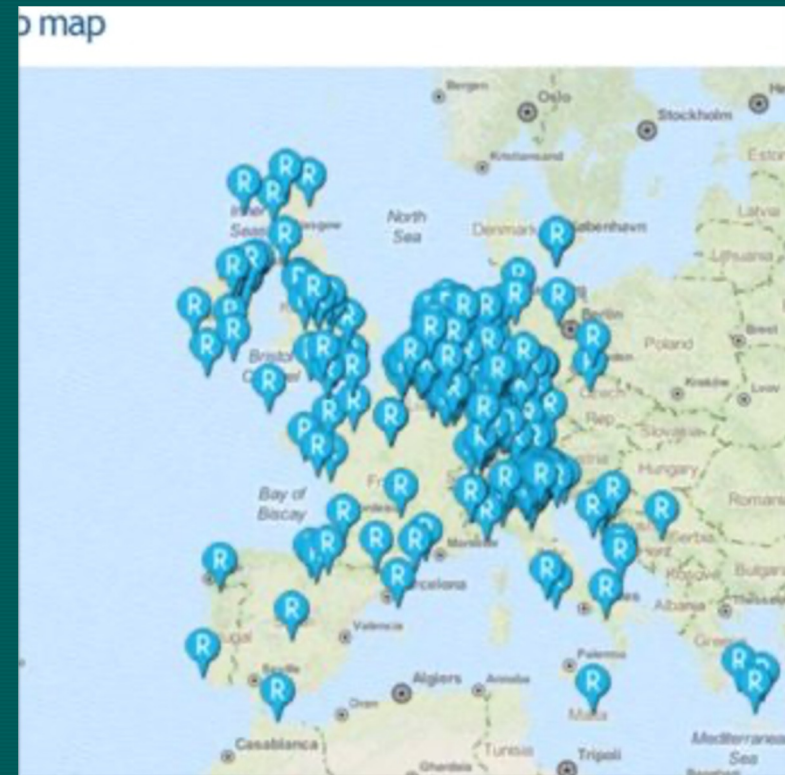


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## D. European “Rescoops” (Renewable energy cooperatives)

- European federation of citizen energy cooperatives
- A growing network of 1.900 European energy cooperatives and their 1,250,000 citizens who are active in the energy transition.

Thanks to Steve Francis from his Belgium experiences 2010-2017



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## E. Australia and the UK

### UK

- Low Carbon Innovation Fund – regulatory levy to fund via contestable fund to support innovation. Requirement to share insights. EDBs also ran contestable funds. Start-ups have grown tremendously as a result e.g. Piclo and Origami Energy (emh-Trade a NZ equivalent attempt without the supporting ecosystem).

### Australia:

- Arena – State funding for innovation, focus on themes, i.e. solar or flexibility to get startups over the line to achieve scale
- A-labs – getting retailers, gentailers, innovators, customers to workshop solutions and pitch for contestable funds. Not like IPAG meetings!
- Hepburn Wind – community-owned organisation that operates the two-turbine facility near the town of Hepburn Springs in central Victoria

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## International experience and Community Energy

- Local & community energy emerging worldwide in developed, emerging and less developed country contexts
- Policies marry local social and economic needs, decarbonization and energy system objectives.
- Community energy projects build local capacity for a wide range of carbon mitigation activities:
  - Energy efficiency, housing, waste, mobility, education, food and agriculture.
- Complacency in NZ, Think Big mindset, silo thinking..

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## The Barriers (1)

Regulator funded 'Powerswitch' is the simplest example of how the regime lock-in presents a barrier. Powerswitch directs consumers to their "lower cost" power providers, assessed simply by today's standard pricing format. The value of an Innovative community retail offer (like BEN's rewards approach for how / when power is used and rewards for social good), is lost though this measure to the consumer. The innovator will not appear high on the list so will not win customers (and probably lose them because of the regulator locking in the current approach). Jamie Silk

Distributed and community energy delivers material lifetime savings, addresses unmet consumer values/ drivers, and delivers benefits to the energy system. But in Aotearoa it has been slow to grow (even considering leaders like solarzero).

This is as CE faces a complex, dynamically connected set of hurdles that mean decisions are not on a level playing field with the default option of our current system. Its a system perfected for what we needed in the past but on to which we want to "layer" on the new rather than transform for the new.

*"Present forward thinking helps you win the game you are already playing; Future back thinking helps you define a new game" Johnson & Suskewicz*

No single hurdle is prohibitive and no single magic bullet levels the field. A formidable barrier arises from the cumulative impact of a). early stage small scale, b). high first mover transaction costs, c). regulatory incentives, incumbent services, market/ consumer defaults, business as usual mindsets and pricing set to optimise a pre-DER world and d). the number of elements and actors needed to deliver the value from DERs and inclusive thinking.

Whilst common to the early stage of many industry transitions, combining a regulated energy sector - that cannot be simply by-passed - with the need to corral many technologies, services, market and behaviour change adoptions in one place, at one time makes energy innovation particularly challenging. The frictions add up. NZ community energy innovators can take 6-12 years from inception to a viable business plan (Ref 2). burning cash and goodwill in both small lean organisations and incumbent players.

Energy transition literature shows the challenge. For a perspective on NZ's alternate energy futures and drivers of lock in to our utility led model, see MacArthur and Berka (Ref 2). For a historical perspective on how the regulated energy sector is particularly effective at maintaining the incumbent regime - and suffering greater shocks later see B Turnheim, F Geels, (Ref 1).



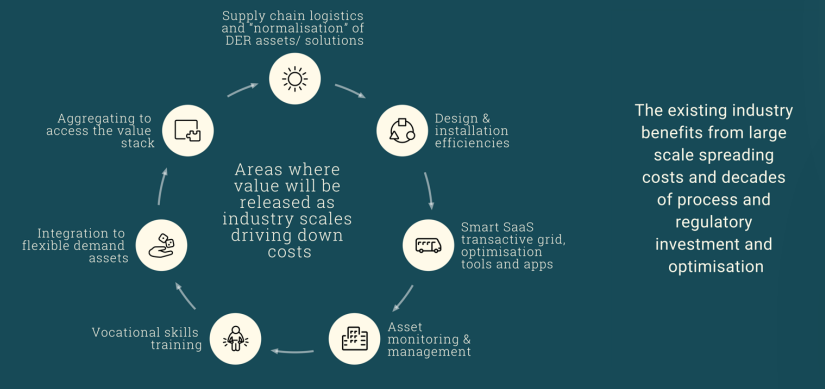
# Complex, dynamic and connected barriers compound to erode progress/ value

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Barriers - industry appears costly until reaching critical scale



The existing industry benefits from large scale spreading costs and decades of process and regulatory investment and optimisation

A series of illustrative “customer journeys” illustrate the compounding friction points that undermine value and opportunity.

Images acknowledged to to Jamie Silk / SAIL

**Barriers - leaders/ innovators face high transaction burden**

**Dynamically connected barriers - engaging consumers**

**Dynamically connected barriers - an un-level financial playing field**

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# Observations 1 : what would help immediately

1. Workshop (led by practitioners rather than ex-regulators) community sector and new entrant experiences for input into the NZ Energy Strategy
2. Require EDBs to report on progress on Open Network Framework commitments before April 2022 (ENA Network Transformation Roadmap, Pp. 22)
3. Ensure a well managed efficient transfer of meter data (ensuring privacy/access rights remain with the householder) in a common, usable and automated format
4. Mandating the establishment of Community Support Hedges for the use of retailers that meet the criteria for a Community Support Retailer
5. Allocate carbon credits for the development of new renewable generation assets
6. Implement National Environmental Standards to remove the regulatory burden on community scale renewable electricity generation projects
7. Develop 'Shared Ownership Guidelines' and requirements to enable community participation in new REG projects.



# Observations 2 : enabling policy instruments

<b>(2) Market access for independent power producers</b>	Grid connection guarantees
	Net metering or billing
	Power purchase guarantees
	Regulated buy-back rates above wholesale price
	Priority dispatch
	Grid upgrade and congestion management costs distributed
	<i>Fees for energy export and/or system services</i>
	<i>Tax on electricity sales</i>
	<i>Zero payment for grid injection</i>
	<i>Tax on generation or capacity</i>
<b>(3) Demand guarantees and market based investment incentives</b>	R&D grants
	Investment subsidies/ capital grants
	Public loans
	Feed-in-tariffs
	Premiums
	Renewable Heat Incentives
	Tax credits / exemptions
	Supplier mandates or obligations
	Quota based Renewable Certificates
	Auction systems (parallel to wholesale auctions)
	Incentives for small-scale DSR & ancillary services

<b>(4) Regional resource planning</b>	Regional investment incentives
	Direct investment by local authorities
	Regional energy demand and supply mapping and planning
	Local authority mediated site pre-feasibility mapping
	Procedures facilitating access to public or private land
	Preferential/rapid planning procedures
<b>(5) Targeted community energy legislation</b>	Community tariffs or premiums
	Community energy grants
	Public seed / capital loan programmes, loan guarantees for community energy
	Local ownership legislation / shared ownership legislation
	Tax privileges
	Service / knowledge exchange / capacity building platforms
Integrated Civic Energy Strategy	

From Anna Berka [Berka, A. L., MacArthur, J. L., & Gonnelli, C. (2020). Explaining inclusivity in energy transitions: Local and community energy in Aotearoa New Zealand. *Environmental Innovation and Societal Transitions*, 34, 165–182. <https://doi.org/10.1016/j.eist.2020.01.006>]

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## Observations 3: Structural transformation

- We've built a system that has been perfected for yesterday. We now need to invest in a system for tomorrow: future proofed, fully renewable, and ensuring energy wellbeing.
- A hybrid, participatory, distributed electricity system is straining to emerge based on affordable clean tech, communications technology and frustration with the market model and the inequities that result, with the powerhouse of innovation in the community sector driving it.
- There is a real risk that the Energy Strategy will not deliver a transformational plan where innovation can grow. How can the community sector participate?

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## The Vision: New participants

A healthy, growing community energy sector supports communities to take ownership of assets that provide renewable generation, operation, and demand management services

Eliminate energy hardship

Increase environmental, social, and economic resilience

Contribute to decarbonization

Provide opportunities for community



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- Lani Kereopa (Te Arawa Lakes Trust)
- Jamie Silk (Slik Advisory / Sustainable Taranaki)
- Chris Lambourne (Manaaki Energy)
- Steve Francis (ex-Sustainable Taranaki)
- Paul Hansen (Te Rarawa)
- Nik Gregg (Sustainability Options)
- Phil Squire (Sustainability Trust /Poneke Power)
- Gareth Cartwright (Community Energy Network)
- Kyle Parker (Sustain & Enable)
- Bill Heaps (Strata Energy Consulting / CEN)
- Kavi Singh (PowerNet)
- Anna Berka (Massey University)

With thanks to  
and insights  
from the  
Community  
sector, Iwi and  
friends